The Federal Interagency Floodplain Management Task Force was established in 1975 to carry out the responsibility of the President to prepare for the Congress a Unified National Program for Floodplain Management. Since 1982 the Task Force has been chaired by the Federal Emergency Management Agency. Membership of the Task Force consists of the Departments of Agriculture, Army, Commerce, Energy, Housing and Urban Development, Interior, and Transportation; the Environmental Protection Agency; and the Tennessee Valley Authority

Design: Mike Campbell, Publications Department, University of Colorado
Cover photo: Bob Cox, Floodplain Management Section, Louisiana Department of Transportation and Development

Floodplain Management

in the

United States:

An Assessment Report

Volume 1
SUMMARY

Prepared for
The Federal Interagency
Floodplain Management
Task Force

Prepared by
The Natural Hazards
Research and Applications
Information Center,
University of Colorado at Boulder

(Contract No. TV-72105A)

1992

Contents

Preface

The coastal and riverine floodplains of the United States are highly desirable and rewarding sites for most kinds of human activities and contain a wealth of natural and cultural resources of immense importance and value to the nation. Yet they are the source of costly and frequently unnecessary losses of human life and property as well as losses of resources afforded by floodplain environments.

In terms of areas affected and annual economic losses, flooding remains the greatest and most persistent natural disaster facing our nation, despite concerted efforts at all governmental levels and within the private sector to moderate, account for, or adjust to the flood risk. These efforts go back at least to the turn of this century, when initially they were focused on controlling the paths of flood waters. Other flood loss reduction strategies and a myriad of programs have since evolved to complement these initial efforts. More recently, increased attention has been given to preserving the natural functions and resources of floodplains.

This assessment of floodplain management in the United States was commissioned in 1987 by the Federal Interagency Floodplain Management Task Force. Its purpose was to provide an evaluation of floodplain management activities in order to report to the public and to the Congress on progress toward implementation of "A Unified National Program for Floodplain Management" [Section 1302(c) of the National Flood Insurance Act of 1968] Thus, it is a compilation of available information concerning the nation's floodplains, experience with tools and strategies to reduce losses of life, property, and environmental resources, and a perspective of what has been accomplished.

The assessment is presented in two parts. This summary report (Volume 1) presents the salient information and findings of the full report (Volume 2) and reflects both its content and organization. Sources of information for Volume 1 and additional detail, explanation, and analysis can be found in the full report

A concerted attempt was made to compile information and available data from numerous sources in an attempt to describe, evaluate, and provide for a balanced view and account of the various activities and management approaches. However, all accounts and contributions to floodplain management may not be adequately documented in this assessment due to the lack of sufficient information or usable data regarding certain subjects or topics. Nevertheless, task force member agencies concurred with the content of this document and believe that this assessment provides the most comprehensive statement available and a foundation for action to improve effectiveness of floodplain management in the United States. It is commended to all parties who make decisions affecting floodplains and their occupants and to those having an interest in learning more about this subject

Frank H. Thomas
Federal Emergency Management Agency
Chair, Federal Interagency Floodplain Management Task Force

Acknowledgments

This summary was prepared under the direction of the Natural Hazards Research and Applications Information Center, University of Colorado at Boulder, and is based on the full report prepared by L.R. Johnston Associates. Both reports resulted from contractual arrangements with the Tennessee Valley Authority, which managed the national assessment effort for the Interagency Task Force. Principal authors of the two reports were Jacquelyn L Monday and the late Larry R Johnston, respectively.

Countless others contributed support, information, and ideas. The Federal Interagency Floodplain Management Task Force provided funding for this study, and an Advisory Committee of the Task Force was created to provide direction and guidance throughout the work effort, including review of draft reports The Association of State Floodplain Managers and the Association of Wetland Managers devoted a portion of their annual conferences to provide information and input to the process A National Review Committee, comprised of recognized experts and chaired by Gilbert F. White (one of the true pioneers of the floodplain management movement that began around 50 years ago) added valuable insight and proposed an *Action Agenda*. Many individuals, including those representing government agencies and professional and nonprofit organizations, also made important contributions by providing information, data, insights, and perspectives.

James M. Wright
Tennessee Valley Authority
Project Manager

Part I

The Nation's Floodplains, Their Value, and Their Floods

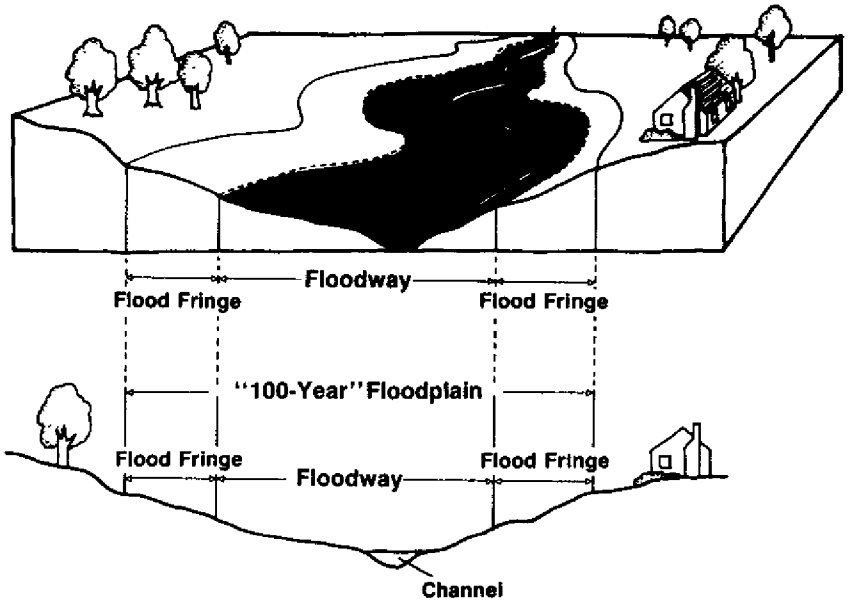
Floodplains

Floodplains are the lowlands adjoining the channels of rivers, streams or other watercourses, or the shorelines of oceans, lakes, or other bodies of standing water. They are lands that have been or may be inundated by flood water. Floodplains are shaped by dynamic physical and biological processes: climate, the hydrologic cycle, erosion and deposition, extreme natural events, and other forces. The products of the complex interrelationships of these processes are many of the nation's most beautiful landscapes, most productive wetlands, and most fertile soils, along with rare and endangered plants and animals, and sites of archaeologic and historic significance Throughout our history, rivers and other bodies of water have been highways for exploration, migration, and commerce and have been used as disposal systems for the byproducts of industrial society. Almost all major cities are located on a river or at the mouth of a river. Most smaller communities have at least one stream that helps define local character and is an important source of community identity.

FLOODPLAIN MANAGEMENT

Floodplain Management is a decisionmaking process the goal of which is "to achieve wise use of the nation's floodplains Wise use" is any activity or set of activities that is compatible with the risk to natural resources (natural and beneficial functions of floodplains) and human resources (life and property) Compatibility is achieved through the strategies and tools of the Unified National Program for Floodplain Management

The Floodplain with Floodway



The U.S Water Resources Council estimated in 1977 that about 7%, or 178.8 million acres, of the total area of the United States, including Alaska and Hawaii, Puerto Rico, and the Virgin Islands, was within the 100-year floodplain The Federal Emergency Management Agency, in a 1991 study that examined nearly 17,500 mapped floodprone communities in the 50 states and the District of Columbia, estimated that there are about 94 million acres. The largest areas of floodplain are in the southern part of the country, but the most populous are along the north Atlantic coast, in the Great Lakes region, and in California.

The Value of Floodplains

In their natural state, floodplains have enormous but often unrecognized value. These complex dynamic systems contribute to the physical and biological support of water resources, living resources, and cultural resources. Floodplains are important to the nation's water resources because they provide natural flood and erosion control, help maintain high water quality, and contribute to sustaining groundwater supplies Floodplains have living, or biologic, resource value, because they support a wide variety of flora and provide

Previous page The Yellowstone River and Hayden Valley in Yellowstone National Park are a river and floodplain relatively undisturbed by human intrusion

habitat for fish and wildlife. The cultural resources of floodplains include the maintenance of a harvest of natural products, places for recreation, scientific study, and outdoor education, and sites of historic and archeological interest

Although the value of these resources is now well recognized and most of the processes contributing to them reasonably well understood, it has proven difficult and sometimes impossible to assign economic values to the functions served and benefits provided by floodplains.

Water Resources

Water can be put to human use either while it is in the stream or other water body or when it is diverted and used elsewhere. Offstream, surface water can be used for irrigation, for industrial and municipal purposes, and energy production. These uses reduce the flow or level of water, at least temporarily, and inevitably degrade its quality somewhat Instream uses of water include navigation, fish and wildlife propagation, waste transport, hydropower generation, agricultural and industrial uses, recreational activities, and supplying drinking water. Instream uses usually require a minimum flow or water level and hence tend to compete with offstream uses.

Flood and Erosion Control

Natural, unaltered floodplain systems can reduce flood velocities, reduce flood peaks, and reduce wind and wave impacts because their physical characteristics affect flood flows and, typically, provide space for the dispersal and temporary storage of flood waters until the natural drainage can carry them away This natural function obviously can reduce the potential damages and loss of life from floods One acre of a floodplain can store about 325,000 gallons of water if flooded to a depth of only one foot. Floodplain vegetation,

Natural and Cultural Resources of Floodplains

Water Resources

Natural Flood and Erosion Control
- Reduce flood velocities
- Reduce flood peaks
- Reduce wind and wave impacts
- Stabilize soils

Surface Water Quality Maintenance
- Reduce sediment loads
- Filter nutrients and impurities
- Process organic and chemical wastes
- Moderate temperature of water
- Reduce sediment loads

Maintain Groundwater Supply and Quality
- Promote infiltration and aquifer recharge
- Reduce frequency and duration of low flows; i.e. increase/enhance base flow

Living Resources

Support Flora
- Maintain high biological productivity of floodplain and wetland vegetation
- Maintain productivity of natural forests
- Maintain natural crops
- Maintain natural genetic diversity

Provide Fish and Wildlife Habitat
- Maintain breeding and feeding grounds
- Create and enhance waterfowl habitat
- Protect habitat for rare and endangered species

Cultural Resources

Maintain Harvest of Natural and Agricultural Products
- Create and enhance agricultural lands
- Provide areas for cultivation of fish and shellfish
- Create and enhance forest lands
- Provide harvest of fur resources

Provide Opportunities for Recreation
- Provide areas for active and consumptive uses
- Provide areas for passive activities
- Provide open space values
- Provide aesthetic values

Provide Areas for Scientific Study and Outdoor Education
- Provide opportunities for ecological studies
- Provide historical and archaeological sites

Coastal barriers are constantly changing land forms They protect much of the Atlantic and Gulf coast from the direct effects of high water, waves, currents, and severe storms

Development on a coastal barrier, Grand Isle, Louisiana